

REMARKS

This amendment is responsive to the Final Office Action mailed on October 24, 2003. This amendment is submitted concurrently with a timely filed Request for Continued Examination and fee. This amendment meets the submission requirement of 37 CFR 1.114 as a submission after Final Rejection. Thus the Examiner is respectfully requested to withdraw the finality of the Office Action and enter this amendment for consideration.

Claim Amendments

Claims 1-3, 5-9, 11-13, and 15-22, are amended herein, claims 23-28 are canceled and new claims 29-34 are added. Claims 1-3, 5-9, 11-13, and 15-22 are amended to more distinctly claim the invention. Specifically, the amended claims now describe a volume provider that configures one or more logical storage volumes based on desired volume behavioral attributes received, via an application programming interface (API), from two applications on the host computer. Support for these amendments can be found, among other places, on Page 12 at line 17-19, and Page 14 at lines 13-22.

Rejection Under §102(e) over D'Errico

In the Final Office Action, claims 1-28 were examined. Claims 1-9, 11-19 and 21-23 were rejected under 35 U.S.C. 102(e) as being anticipated by D'Errico et al., (U.S. Pat. No. 6,457,139, hereinafter "D'Errico"). Claims 24-27 were rejected under 35 U.S.C. 103(a) as being obvious in view of D'Errico. Claims 10, 20, and 28 were rejected under 35 U.S.C. 103(a) as being obvious over D'Errico in view of Blumenau (U.S. Pat. No. 6,240,511 hereinafter "Blumenau").

Under 35 U.S.C. § 102, a reference must show or describe each and every element claimed in order to anticipate the claims. *Verdegaal Bros. v. Union Oil Co. of California* 814 F.2d 628 (Fed. Cir. 1987) ("A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.").

D'Errico describes a computer having a "file system/[logical volume mapping]LVM layer 23 [that] can simply create logical volumes of the appropriate size, and need not give any consideration to where those logical volumes should be placed within the storage system 3 to

maximize system performance.” D’Errico Col. 4, lines 34-38. D’Errico also describes “storage system mapping layer 25 that resides on the storage system, and that maps from the logical volume provided from layer 23 to an actual physical location.” D’Errico Col. 2, lines 19-21.

Applicants respectfully submit that D’Errico does not anticipate the Applicants’ claims as amended herein because D’Errico does not show or describe each and every element. The following is a discussion of each of the independent claims with respect to D’Errico highlighting elements that D’Errico does not show.

Independent Claim 1

Independent claim 1, as amended, now claims that “the volume provider maps the logical storage volume based on first desired behavioral attributes received from a first application and second desired behavioral attributes previously received via the API from a second application.” Specifically, D’Errico does not show or describe a volume provider that configures a logical storage volume based on desired volume behavioral attributes received, via an application programming interface (API), from two applications as now claimed.

In D’Errico, neither the LVM layer 23 nor the mapping layer 25 receive behavior attributes from two applications on the host computer to configure logical volumes. Therefore, D’Errico cannot disclose “the volume provider maps the logical storage volume based on first desired behavioral attributes received from a first application and second desired behavioral attributes previously received via the API from a second application” as now claimed in amended claim 1.

Furthermore, the information disclosed by D’Errico received by the LVM layer 23 and mapping layer 25 does not correspond to the behavioral attributes as claimed. D’Errico’s LVM layer 23 receives data and maps it into logical volumes onto an assumed physical drive. The mapped logical volume is then passed to the mapping layer 25 which then remaps the logical volumes onto the actual drives. D’Errico discloses only three types of information being passed to the LVM layer and mapping layer: a) data from applications (D’Errico, Col. 2, lines 8-13); b) data in the form of mapped logical volumes (D’Errico, Col. 2, lines 18-24); and c) “information relating to the physical mapping for a particular logical volume, as well as information relating to certain characteristics of the physical device(s) on which the logical volume is stored.” D’Errico, Col. 15, lines 17-20. D’Errico’s LVM layer 23 and mapping layer 25 do not receive desired

behavioral attributes indicating the desired performance characteristics of the volume on the storage system.

Furthermore, in D'Errico, it is up to the system administrator to control the performance of the storage system by directing the physical configuration of logical volumes (such as requiring that logical volumes be configured as striped or mirrored logical volumes). The administrator's directions regarding the physical configuration are given based on the administrator's knowledge of how the different physical configurations will affect system performance. D'Errico does not teach or disclose a volume provider that directs the physical configuration of logical volumes based on desired behavior attributes dictated by applications, rather than system administrators.

Therefore, as D'Errico does not teach each and every element of the independent claims, D'Errico does not anticipate the claims under 35 U.S.C. §102. Thus, the Applicants respectfully request that the Examiner withdraw this rejection and find the independent claim 1 and all the claims dependent therefrom to be in a condition for allowance.

Independent Claim 11

Claim 11, as amended, now claims "configuring, by the volume provider, one or more storage volumes of the storage subsystem as a function of the first and second storage access information and physical characteristics of the storage subsystem," wherein the first and second storage access information are received from a first and second application, respectively. Again, D'Errico does not teach or disclose all of the elements in independent claim 11.

As discussed above, D'Errico does not teach or disclose a volume provider receiving access information from two applications on the host computer. D'Errico also does not teach or disclose configuring a logical volume based on information received from two applications.

In addition, the storage access information, as claimed, characterizes desired behavioral attributes (such as an indication of a desired fault tolerance or anticipated access pattern for the data) rather than physical constraints (such as place the data in certain location on a drive), as taught by D'Errico.

Therefore, as D'Errico does not teach each and every element of the independent claims, D'Errico does not anticipate the claims under 35 U.S.C. §102. Thus, the Applicants respectfully

request that the Examiner withdraw this rejection and find the independent claim 11 and all the claims dependent therefrom to be in a condition for allowance.

Independent Claim 21

Claim 21, as amended, now claims “configuring, by the volume provider, one or more storage volumes of the storage subsystem based on the first and second storage access information,” wherein the first and second storage access information are received from a first and second application, respectively. Again, D’Errico does not teach or disclose all of the elements in independent claim 21.

As discussed above, D’Errico does not teach or disclose a volume provider receiving access information from two applications on the host computer. D’Errico also does not teach or disclose configuring a logical volume based on information received from two applications. 

In addition, the storage access information, as claimed, characterize desired behavioral attributes (such as an indication of a desired fault tolerance or anticipated access pattern for the data) rather than physical constraints (such as place the data in certain location on a drive), as taught by D’Errico.

Therefore, as D’Errico does not teach each and every element of the independent claims, D’Errico does not anticipate the claims under 35 U.S.C. §102. Thus, the Applicants respectfully request that the Examiner withdraw this rejection and find the independent claim 21 and all the claims dependent therefrom to be in a condition for allowance.

New Independent Claim 31

New claim 31, as amended, now claims “configuring the logical volume based on the first and second desired behavioral attributes and physical characteristics of a storage system,” wherein the first and second desired behavioral attributes are received from a first and second application, respectively. Again, D’Errico does not teach or disclose all of the elements in independent claim 31.

As discussed above, D’Errico does not teach or disclose a volume provider receiving desired behavioral attributes from two applications on the host computer. D’Errico also does not teach or disclose configuring a logical volume based on such desired behavioral attributes received from two applications.

In addition, the desired behavioral attributes (such as an indication of a desired fault tolerance or anticipated access pattern for the data) do not correspond to the physical constraints (such as place the data in certain location on a drive), as taught by D'Errico.

Therefore, as D'Errico does not teach each and every element of the independent claims, D'Errico does not anticipate the claims under 35 U.S.C. §102. Thus, the Applicants respectfully request that the Examiner withdraw this rejection and find the independent claim 31 and all the claims dependent therefrom to be in a condition for allowance.

Conclusion

Applicants wish to thank the Examiner for the consideration extended to Applicants' representative during the telephone interviews conducted on October 14 and November 4, 2003 during which Applicants' representative and the Examiner discussed proposed amendments that would further clarify the distinctions between the claimed invention and the prior art of record. A formal Interview Summary has been submitted describing the first interview. The Examiner indicated that the second interview did not require a second formal Interview Summary, as the discussion consisted only of a clarification of the points discussed in the first interview.

Applicants also wish to thank the Examiner for his assistance with the issue of resetting the date for the Office Action. The Examiner's assistance was greatly appreciated.

As a result of this amendment, claims 1-22 and 29-36 remain pending in this application. This amendment is believed to be fully responsive to all points in the Office Action. Pending claims 1-22 and 29-36 are believed to be in a condition for allowance. In view of the above amendments and remarks, Applicant respectfully requests a Notice of Allowance. If the Examiner believes a telephone conference would advance the prosecution of this Application, the Examiner is invited to telephone the undersigned at the below-listed telephone number.

Respectfully submitted,

2/27/07

Date



George C. Lewis, Reg. No. 53,214
Merchant & Gould P.C.
P.O. Box 2903
Minneapolis, MN 55402-0903
(303) 357-1639/(303) 357-1671 (fax)